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# MEDICAL NEWS LETTER

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## MEDICAL NEWS LETTER

Vol. 42

Friday, 18 October 1963

No. 8

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The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

Change of Address

Please forward changes of address for the News Letter to: Commanding Officer, U. S. Naval Medical School, National Naval Medical Center, Bethesda, Maryland 20014, giving full name, rank, corps, and old and new addresses.

The issuance of this publication approved by the Secretary of the Navy on 28 June 1961.

Intracranial Space Occupying Lesion -  
an Unusual Case

By LT G. A. Magid MC USNR\*. From the Proceedings of the Monthly Staff Conferences of the U. S. Naval Hospital, NNMC, Bethesda, Md., 1961 - 1962.

This 18-year old, right-handed white male AN/USN was in excellent health until 3 March 1961 when he was accidentally struck in the left frontotemporal region by the swinging door of a disposal unit. Although he "saw stars," he was not knocked unconscious, but did not sustain a laceration or abrasion. There was moderate pain at the injury site which subsided in 10 minutes and the patient resumed his duties.

Ten days later, he experienced the onset of severe dull predominantly left frontotemporal headaches. He reported to a medical officer after obtaining no relief from salicylates or "seltzers." He was given Darvon (R) which failed to relieve the symptoms. On the following day, codeine relieved the headaches. On 15 March 1961, he was brought to the dispensary because of stuttering, slurred speech, flattening of affect, and thought dissociation. Physical examination elicited spatial and temporal disorientation with memory loss. He was able to answer only "yes" and "no" questions, and this took considerable time. Physical examination, including ophthalmoscopic and neurologic examination, was negative. The disorientation cleared in about 15 minutes and the patient answered questions promptly though he complained of headache. Accordingly, he was transferred to the U. S. Naval Hospital at Corpus Christi, Texas, where physical examination was reported within normal limits except for a 1 cm stellate scar, old, with slight tenderness in the left temporal region. The neurologic examination was within normal limits. Skull films showed an intracranial calcification in the left frontal area. Blood count, urinalysis, and chest X ray were within normal limits. He was observed for one week and, having had an asymptomatic hospital course, was discharged to duty on 22 March 1961.

During the next 3 weeks, the patient had episodes of vomiting without preceding nausea, prior to and after breakfast. Following emesis he did not feel ill, but continued having severe left frontotemporal and bifrontotemporal headaches unrelieved by aspirin or Darvon (R). A definite personality change with deterioration in his aptitude and attitude for work was reported. He developed increasing lassitude to the point where he felt "three-quarters drunk all the time" and had difficulty keeping his eyes open. Concomitantly, he became constipated for as long as a week though he had never been constipated for such a long period previously in his life. An episode of slurred speech was noted during which time he could not remember his name. Because of the development of these symptoms, the patient was admitted to the U. S. Naval Hospital, Corpus Christi, Texas, on 30 May 1961.

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\* On Staff of Neurosurgery Service, USNH Bethesda, at the time of this presentation; returned to Mayo Clinic in January 1963.

Physical examination on admission was within normal limits. The patient was alert, cooperative, oriented, and revealed no anxiety. Past history established that at age 3 years he fell off a counter at home, striking his left frontotemporal area on the tail of a toy glass dog, causing a laceration with the resultant scar in that area. Two electroencephalograms were reported as being within normal limits. The skull X ray showed a "left 6 mm rounded calcific density in the left frontal region. The previously noted radiolucent defect in the right frontal region is also noted. The signs are essentially unchanged from the examination of 16 March 1961. No other abnormalities are noted."

A lumbar puncture was performed on 4 June 1961 which revealed an opening pressure of 380 mm of water and a closing pressure of 350 mm of water with the cerebral spinal fluid being clear and colorless. The spinal fluid findings were: cell count, 11 (no differential was noted); protein, 42 mgm%; sugar, 52 mgm%; chlorides, 116.5 milliequivalents per liter. The spun specimen was stained for acid fast bacilli but none were found. While in the hospital, the patient was noted to have eaten and slept well. However, throughout the day, he appeared frequently with his head down upon a bed or table as if asleep. When pushed, he would cooperate in ward work, but frequently would discontinue it and return to a sitting position with the head down. He stated that just standing up holding a cord to a buffer would cause him to feel "in a daze" and that he felt better sitting. He had several episodes of vomiting, both on empty and full stomach, and without evidence of preliminary nausea. The headache continued unabated. Because of increased intracranial pressure and an intracranial calcification, the patient was transferred to the U. S. Naval Hospital, Bethesda, Md., for further therapy.

On arrival at the National Naval Medical Center, Bethesda, Md., on 5 June 1961, the patient was a well developed, well nourished white male in severe distress from headache. He claimed to have lost approximately 17 pounds. There was a bradycardia of 46. There was bilateral severe papilledema, perhaps more marked on the left than on the right. A tiny scar over the region of the left pterion was at the site of the laceration sustained as a child. The general physical examination and neurologic examination were not remarkable except for the defects noted above. X-ray examination of the skull revealed the presence of a small density, presumably that of a foreign body which appeared to lie in the left frontal lobe. Adjacent to this in the left frontal bone was a very tiny bony defect. X ray of the chest was normal. Serology, urinalysis, blood counts, and all other indicated laboratory procedures were within normal limits.

On 8 June 1961, under local anesthesia, a left percutaneous carotid arteriogram was performed. This gave evidence of a space-taking lesion in the left frontal lobe. On that same date, a left frontal craniotomy was performed and demonstrated a large multiloculated brain abscess lying in the left frontal lobe. In the central portion of this abscess was found a porcelain chip, presumably the tail of the small porcelain toy dog. Cultures taken at the time of operation proved to be negative for acid fast organisms and fungi. Smears of pus showed many gram positive cocci. Subsequent cultures of this

material developed a growth of a coagulase positive staphylococcus aureus sensitive to all common antibiotic agents.

The postoperative course was benign and uneventful. Contrary to expectations, the patient never presented a seizure problem, and there was no suggestion of any meningeal reaction to the presence of the abscess. By the end of the third week following surgery he had improved sufficiently to be fully ambulatory about the ward and hospital. Psychologic and psychiatric evaluation was obtained with the resulting opinion that there was no contraindication to the patient's return to a status of limited duty. At the time of this report the patient is in the process of appearing before a survey board with a recommendation for limited duty.

\* \* \* \* \*

#### Report of Open Heart Surgical Case \*

LCDR S. B. Butterfield MSC USN, \*\* U. S. Naval Hospital, San Diego, Calif.

Early in July 1963, the Blood Bank of the U. S. Naval Hospital, San Diego, Calif., was notified of a potential open-heart surgical patient, M. G., age 31, known to have been sensitized by pregnancy and/or transfusion to the Duffy<sup>a</sup> blood group factor. On 9 July, blood specimens were drawn and the serum evaluated. Duplicate specimens were sent to the American Association of Blood Banks Reference Laboratory in Long Beach. Their report confirmed the Blood Bank findings: Patient of Group "O", Rh Negative (cde/ce) with Anti-Duffy<sup>a</sup> antibodies.

The Blood Bank has two primary sources of emergency donors. A file of volunteer donors among the staff personnel is supplemented by information from the Data Processing Division records on all staff personnel. In addition, blood groupings are performed on all students reporting to the Hospital Corps School on the compound. It was decided to test individuals from these groups rather than contact personnel attached to other military activities in the San Diego area as is the usual procedure in procuring donors for open-heart surgery cases.

For this case, a total of 35 Group "O" Rh Negative (D) volunteers from the hospital staff responded to the request and 25 Group "O" Rh negative (D) responded from the Hospital Corps School. The command to which the husband of the patient is attached—the ICA School of the Naval Training Center—wished to support the needs of the patient. Of the 58 Group "O" volunteers tested, 19 were of Group "O" Rh Negative (D) Blood. Between the dates of

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\* Article forwarded to the Medical News Letter by Rear Admiral H. J. Cokely MC USN, Commanding Officer, U. S. Naval Hospital, San Diego.

\*\* LCDR Butterfield is Officer in Charge of the Blood Bank, U. S. Naval Hospital, San Diego, Calif.; CAPT R. M. Dimmette MC USN is Chief of Laboratory Service where this work was performed.

19 and 30 July, 70 Group "O" Rh Negative (D) donors were examined for cell factor compatibility with the patient; 21 proved to be Group "O" Rh Negative (cde/ce), Duffy<sup>a</sup> Negative, and compatible in all respects with the patient. Anti-Duffy<sup>a</sup> serum was generously provided by Dade Reagent Laboratories of Miami, Fla., for this critical cell group test. The Chief of Thoracic Surgery was notified of the availability of 21 compatible donors; the date of 19 August was set for the surgical procedure for closure of an interventricular septal defect. On 30 July, 9 of the original Staff and Hospital Corps School volunteers were tested; 3 of this group were compatible and of the proper blood groups.

As a routine at this hospital, donors are bled immediately prior to open-heart surgery procedures. Of the 24 compatible donors, 18 (6 Hospital Staff; 3 Hospital Corps School Staff; and 9 NTC Staff) donated on the morning of 19 August: 10 in heparin and 6 in ACD anticoagulants. One donor only of the 24 was rejected for physical reasons (low hemoglobin), one donor was not available, and 4 were reserved as "walking donors" in the event of postoperative emergency need. The surgical procedures proved uneventful for the Blood Bank; no additional donations were required postoperatively. The units actually utilized for the patient were 10 heparinized and 3 ACD units.

This donor recruitment challenge might be presented to any Blood Bank Transfusion Service. Statistically, compatible donors could be expected among 33 to 35% of the general population. For this reported case, of 79 Group "O" Rh Negative (D) donors tested, 24 proved to be of Group "O" Rh Negative (cde/ce) and Duffy<sup>a</sup> Negative, a percentage of 30.14. It is acknowledged that this percentage rate is influenced by elimination of 2 individuals whose cells contained other Rh factors (C and E). However, to provide a few additional units of stock blood in case of postoperative emergency, 6 Group "O" Rh Negative (cde/ce) units were selected from the refrigerator for cross-matching; 4 were Duffy<sup>a</sup> Negative and compatible with the patient, yielding a final percentage rate of 32.9.

This case is reported because other sizeable hospitals with Blood Banks were unable to make this type of life-saving surgery possible. With the large Blood Bank at the U. S. Naval Hospital, San Diego, and the adequate donor pool in the area, cases of similar nature requiring special donors may be afforded surgery which is not available at other hospitals.

\* \* \* \* \*

Health Services in the Arctic. In the Arctic, a single journey to hospital may begin on a dog or reindeer sledge, continue with motor transport, and end in a helicopter or aeroplane—an exhausting experience for the patient. In principle, institutional services are brought as close as possible to those who need them, but in sparsely populated areas with deficient communications, the organization of hospital services presents special problems.

—WHO Chronicle 17(9):319-334, September 1963

The Treatment of Acute Infectious Hepatitis \*

## Ten-Year Follow-up Study of the Effects of Diet and Rest

M. Dean Nefzger PhD, Washington, D. C., and Thomas C. Chalmers MD, Boston, Mass. Amer J Med 35(3): 299-309, September 1963.

In the ten years following World War II, strict bed rest became entrenched in the minds of most physicians as the only effective method of therapy for acute infectious hepatitis. Application of this principle resulted in prolonging hospitalization and disability time considerably when compared with the more casual treatment in effect before World War II. In carefully designed and controlled studies conducted among members of the Armed Forces in Japan, it was found that patients treated with *ad libitum* bed rest improved just as rapidly as those kept at strict bed rest, and that patients who were returned to active physical rehabilitation as soon as results of their liver function tests were relatively normal, had as uncomplicated a convalescence as those sent back to duty much more gradually.

Reluctance on the part of military and civilian doctors to accept the validity of this result is attributed principally to the lack of long-term follow-up information on possible disabilities caused by early ambulation. Many clinicians have the impression that patients who do not stay at strict bed rest have a significant increase in symptoms and signs referable to their hepatitis. Since no evidence of this could be found in a one-year follow-up study of a randomly selected group of subjects studied in Japan, it was thought essential to gather information on the occurrence of residual abnormalities in these men over a longer period.

Another conclusion of the earlier studies was that forcing the patient to consume a high protein diet from the time of his admission to the hospital until his discharge shortened the duration of acute illness by approximately 20%. This treatment has not been enthusiastically advocated because it is quite difficult to carry out in the anorectic patient and also because in the one-year follow-up study, there was some suggestion of an increased number of residual abnormalities among these patients. However, a 20% reduction in the duration of illness is of considerable practical importance, and it seemed desirable to determine whether the patients in whom this was accomplished did, in fact, have more difficulties following discharge from the hospital.

Although the best assessment of the long-term effects of treatment probably would require reexamination of all the patients who participated in the original studies, such an undertaking seemed unwise without first utilizing more accessible sources of information. Therefore, it was decided to base this study on data obtained from (1) medical records maintained by the Army and Veterans Administration, (2) questionnaires answered by patients, and (3) to whatever extent possible, private medical records.

To assess the long-term effects of treatment, the 460 men enrolled in these trials were followed up by means of Army and Veterans Administration records and questionnaires, to 30 June 1961. Similar data were obtained for

496 enlisted men who served in Korea during the period of study but who were not hospitalized at any time.

The differences in mortality rates, cause of death, hospital admission rates, hospital diagnoses, and Veterans Administration disability ratings were not statistically significant, or even consistent among the various original therapeutic regimens. The records of 96 patients with follow-up diagnoses of possible relevance to hepatitis were reviewed in detail. None contained evidence of serious chronic liver disease, 10 contained convincing clinical evidence of minimal liver disease, and 14 contained suggestive evidence of residual effects. There is some evidence that infectious hepatitis occasionally may last about two years but eventually clears up completely.

When all hepatitis patients were compared with the group of nonhospitalized men, mortality rates were found to be almost identical. However, the hospital admission rates, the proportion of men with at least one change in employment, and proportion of men with complaints referable to hepatitis are greater for the hepatitis patient.

- \* From the Committee on Veterans Medical Problems, National Academy of Sciences—National Research Council, Washington, D. C., and the Medical Services of the Lemuel Shattuck Hospital, Department of Public Health, Commonwealth of Massachusetts, and the Department of Medicine, Tufts University School of Medicine, Boston, Mass. This study, sponsored by the Surgeon General's Advisory Committee on the Liver, was supported under Contract No. DA-49-193-MD-2130 with U.S. Army Medical Research and Development Command, and is part of the program developed by the NAS-NRC Committee on Veterans Medical Problems at the request of the Veterans Administration and the Department of Defense.

\* \* \* \* \*

### Shark Attack\*

#### Etiology - Clinical Pathology - Treatment

P.H. Davies MSc, PhD, and C.D. Campbell MB, MRCP. From the Oceanographic Research Institute, Durban, South Africa. Journal of the Royal Medical Service - Summer 1962.

The area of the world's seas where sharks are active stretches around the globe and is extensively used by Navy ships. It is, therefore, desirable that medical officers should be fully aware of the problem. The authors present a valuable treatise on shark attacks based on observations in eleven cases in Natal, South Africa.

#### Factors Affecting Shark Attack

Turbidity. Turbidity and extensive discoloration of the sea along the coast is indicative of the presence of flood waters from rivers and it is probable that sharks are attracted to flooded areas due to the likelihood of finding food organisms there. In addition, the presence of fresh water shown by discoloration of the sea is of importance in indicating the species of shark.

Temperature. Temperatures ranged from 70.5°F to 82°F. Observations of living sharks at the Oceanographic Research Institute, Durban, indicate that the predatory activities of sharks increase as a result of sudden changes of temperature (irrespective of direction of change) and, in addition, high temperatures above 80°F would affect the metabolic rate and probably induce early hunger.

Salinity. Salinity has recently come into prominence as a factor of considerable importance as a result of findings in relation to the species of shark. Some species have a strong affinity for fresh water; it is possible that flood water from rivers along inshore areas attracts some sharks.

Depth. Depths of attack have ranged from 2 to 3 feet to 12 feet in the ten cases for which depth was available. The shallowest attack of 2 to 3 feet took place alongside a channel 10 feet in depth.

Distance from Shore. The distance from the shore varied from 30 to 240 feet in the ten cases for which data were available.

Geomorphology of Beaches and Sea Floor. In nine cases out of ten for which the information was available the attack took place either in, or in the immediate vicinity of, a relatively deep channel. The presence of a channel provides comfortable access for sharks of large size to shallow bathing areas.

Condition of Sky. The condition of the sky apparently bears no relation to shark attack since approximately half the attacks investigated took place in bright sun and half with an overcast sky.

Color of Costume. The color of costume has no apparent effect. This bears out recent findings of Gilbert (Xth Pacific Science Congress - 1961) that retinas of sharks he investigated did not possess cones and, therefore, were unable to perceive color. Gilbert also established that certain sharks possess vision particularly adapted to seeing in low light intensities.

It should be stressed that the color of a victim's skin or clothing in relation to the background is of importance since strong contrast would facilitate location of prey by means of vision. A bright piece of jewelry might be significant.

Date and Time of Attack. Of the eight attacks that took place off the east coast of South Africa, seven occurred in summer and one in autumn. Of three cases occurring farther north, one took place in summer and two in autumn. This tends to confirm the general tendency of shark attacks to be made in summer between latitudes 20°- 40° S. Six out of ten attacks took place between 1400 and 1700 hours, but the remaining four took place between 0900 and 1100.

State of Tide and Phase of Moon. The state of the tide and phase of the moon appeared to have no bearing on shark attack in ten cases.

Discharge of Sewage and Industrial Effluent. This takes place at a number of points along the east coast of South Africa, but there is no positive evidence that large sharks are attracted to these outfall points.

### Clinical Pathology

The principles that underlie the treatment of battle casualties or the reaction of laboratory animals to limb amputations do not necessarily apply to cases

of shark attack since the unexpected nature and brevity of a shark attack can create great mental agitation. The victim may be injured in deep water, a considerable distance from shore; he may have to swim through a strong surf in a deeply shocked condition, having sustained heavy loss of blood and hampered by a useless limb. Having reached the shore, he is faced with handling by untrained people and by the possibility that first aid facilities for treating such cases are generally inadequate. The syndrome of shark attack is one, therefore, that combines extreme neurogenic shock, torrential blood loss, and acute physical exhaustion. Effects of the bite can be divided as follows:

Cutting Wounds. The major effect in cutting wounds is massive blood loss due to deep incisions and the clean-cut nature of the wound. Such cases require large amounts of blood and plasma. One case required twenty-one pints of blood during the three days following admission.

Crushing Wounds. Frequently there is comminution of the long bones and crushing of muscles and soft tissues with destruction of blood supply.

Tearing Wounds. In such cases much tissue may be lost, the shock considerable, and deep-seated infection possible.

Bacteriologic Effects. In the past it has been customary to excise the wounds widely to prevent infection. Fortunately, the newer antibiotics have shown effectiveness in combating the bacterial flora of the shark's teeth. Coliform organisms which are strongly hemolytic have been cultured from the teeth of living sharks and, although resistant to penicillin, have been found to be sensitive to chlortetracycline, chloramphenicol, and oxytetracycline. Tetanus and gangrene have been reported to occur and it is wise to use antisera in treatment of shark bites.

Radiologic Effects. Two reasons for X-raying wounds of shark victims are: (1) With reference to treatment, it is important for the surgeon to know if foreign bodies are present in the wound; and (2) with reference to investigations on the species of shark responsible, the recovery of teeth fragments and study of defects in the bones contribute valuable evidence in identification of attacking species.

General progress of the patient is according to the major vessels severed and is illustrated under The Durban Classification on page 11.

### Treatment

The Shark Attack File kept by the American Institute of Biological Sciences Research Panel contains records of 798 unprovoked attacks and shows that 390 individuals recovered and 408 died—a 51% mortality rate.

In the series of attacks on the Natal south coast in the last five years, the doctor concerned achieved spectacular success with the beach treatment procedure. He did not rush the patient to a hospital, but used special facilities available locally. Only when the patient had recovered from the initial shock was he moved. Judging from previous reports, past treatment of shark attack included tying of tourniquets and immediate removal of the patient to hospital. Radical surgery was usually performed mainly to offset the possibility of serious infection. The words "the victim was rushed to the hospital,

but died soon after admission" occur so frequently in accounts that the possibility that the "rushing" contributed materially to the fatal outcome cannot be ignored.

### THE DURBAN CLASSIFICATION

GRADE OF INJURY	MAJOR VESSELS SEVERED or DESCRIPTION OF WOUNDS	PROGNOSIS
Grade One	Both femoral arteries One femoral and one posterior tibial artery One femoral artery in upper third	Fatal
Grade Two	One femoral artery in lower two-thirds One brachial artery Two posterior tibial arteries Abdominal wounds with bowel involvement (major)	Should survive with proper treatment on the beach
Grade Three	One posterior tibial artery Superficial limb wounds; no vessels cut Superficial abdominal wounds; no peritoneal involvement Both forearm vessels (probably) – no case seen	Should survive with proper treatment on the beach

The shark victim is generally exhausted and shocked by the extreme exertion of struggling with the shark and swimming through the surf to the beach. Such a person appears to fare better if he spends 30 to 60 minutes lying quietly—whether sedated or not—in the head-down position on the beach. At the same time he is kept cool rather than being carried to a car and exposed to a painful journey to the hospital. It is considered preferable to rush plasma or blood to the patient who should be left lying on the beach near where he was attacked. If tourniquets are properly applied, little additional harm can come to him if he is kept quiet, cool, and in the head-down position. Surf bathers are usually in good physical condition and, if allowed a short time to bring their acute anti-stress mechanisms into play, can be expected to make a dramatic recovery from shark attack. The main factors involved in this change of approach in treatment are (1) it is now possible to provide powerful anti-shock measures for victims on the beach without moving them, and (2) new antibiotics are remarkably effective in combating infection in wounds.

### Adjuvant Therapeutic Measures on the Beach

A special emergency pack has been designed containing:

One liter of normal saline	Ampoules of morphine, coramine,
One bottle dried human plasma	and noradrenalin
One bottle plasma diluent	Swabs
Two plastic intravenous giving sets	Alcohol
Syringe	Tourniquets

In a shark attack area, a doctor should keep an emergency pack available at all times. This pack with slight modifications (e. g. containing two bottles of plasma) has been placed at thirty locations along one hundred miles of the Natal coast. Plasma is preferred to Dextran; the latter may deteriorate rapidly in hot climates. Plasma supplies are replaced every six months.

### Rescue and Treatment in Shark Attack

Try to chase the shark away as it may make a second attack. Move the patient no farther up the beach than is required to avoid wave action, and place him in the head-down position on the slope of the beach. Apply tourniquets at once. Lay people should do nothing more and should call a doctor at once.

Give no warm drinks or alcohol. Cover the patient with a light wrap or towel. Sips of fresh water may be given. Attempt no other local measures apart from stopping bleeding and covering wounds with a clean towel. The doctor should use an emergency pack at once; the bottle of saline should be set up and while this is running the plasma should be rapidly reconstituted and immediately substituted. Send for more plasma or blood if obtainable.

Give morphine gr 1/4, whether pain is present or not. Record pulse and blood pressure frequently. Severe shock should be a contraindication to moving the victim. The patient should be moved only under medical supervision and the hospital should be forewarned.

Record pulse and blood pressure as the patient leaves the beach, together with a note of drugs given. Note also, for the benefit of the surgeon, whether the wound is jagged, appears to have involved the abdominal cavity, and if the sea was contaminated by effluent or other discolored material. Keep the I. V. going. The ambulance driver should drive slowly.

### In the Hospital Emergency Room

Immediately type, crossmatch, and start blood. Blood pressures should be checked against beach readings. It is advisable (1) to give tetanus and gas-gangrene antitoxin at once; and (2) injection of large dose of a broad-spectrum antibiotic, intramuscularly. Dressings should not be disturbed in the emergency room.

### In the Surgical Ward and Operating Room

Note whether resuscitation is complete, and the extent of wound contamination. Record carefully the following features:

1. Diameter of the sweep of the jaws from wounds.
2. Presence of bony lesions.
3. Characteristics of skin punctures.
4. Characteristics of skin edges (clean-cut or jagged).
5. Whether there are two discrete rows of teeth marks visible.
6. Distance between lesions made by teeth in the front row.
7. Skin lesions that may have been made by "bumps" by the shark.

Careful photographic records of all wounds should be made in color and black and white if possible.

Delay operating as long as advisable. Be conservative in surgical measures. Remove dressings after induction and swab all lesions with sterile throat swabs which should be inserted deeply into any lesion. These should be plated out at once for organism sensitivity. Debride only obviously necrotic tissue; do not attempt to remove all tissue involved. If the blood supply is intact, even the most infected and lacerated limb can be saved with return of function. Do not attempt tendon suture unless the wound is very clean. If the bowel is involved, resect widely and exteriorize. Do early skin grafting when possible to preserve nerves, tendons, vessels, joints, and even muscles.

The surgeon can expect a clean field in a short time with the combination of healthy tissues and powerful antibiotics; intravenous therapy should not be prolonged, and intensive physiotherapy should be instituted as soon as possible.

#### Preventive Measures in Shark Attack

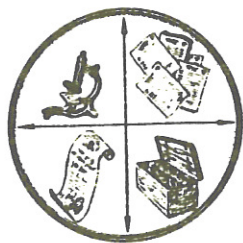
World mortality of shark attack is approximately 49%. In Natal, even with the most modern methods of treatment, one can still expect a high mortality. The chief remedy is in prevention. In addition to avoiding shark-infested beaches, bathers should avoid muddy waters of any depth, they should remove ornaments that reflect the light, but above all, they should heed the directions of the life guard. It seems strongly evident that the greatest factor involved in saving shark victims is timely emergency treatment. Probably the greatest task of the life guard or ambulance worker will be to protect the victim from members of the public who seldom restrain a desire to "do something" for a seriously injured person.

#### Reference:

Schultz, Leonard P. (1958). World Shark Attack File (in preparation). U. S. National Museum, Department of Fishes, Washington, D. C.

\* Abstracted and reported by LCDR A.H. Barsoum MC USN, Assistant Medical Officer, U. S. Naval School, Deep Sea Divers, U. S. Naval Station (Washington Navy Yard Annex), Washington, D. C.

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## MISCELLANY

### SALUTE AND WELCOME ABOARD!

Eleven Foreign Military Medical Officers and one Nurse reported on 5 September 1963 for the Sixth Annual Course which is conducted by the U. S. Naval Medical School. These specially selected representatives from eight foreign countries were welcomed aboard by RADM C. B. Galloway MC USN, Commanding Officer of the National Naval Medical Center, CAPT John H. Stover Jr, MC USN, Commanding Officer of the U. S. Naval Medical School, and Commanding Officers of the National Naval Medical Center component commands.



FOREIGN MILITARY MEDICAL OFFICERS TRAINING PROGRAM  
U. S. NAVAL MEDICAL SCHOOL  
NATIONAL NAVAL MEDICAL CENTER  
BETHESDA, MARYLAND 20014  
1963

FIRST ROW: CAPT J. M. HIRST MSC USN, LT Henrique da Costa CORREA MC (Brazil), CAPT Helio Vecchio Alves MAURICIO MC (Brazil), LTCOL Azhar ZAHIR MC (Indonesia), LT Isidora BERNARDEZ NC (Philippines), CDR Pierre M. NIAUSSAT MC (France), LCDR Ananias L. VELASCO MC (Philippines), CAPT J. H. STOVER, Jr. MC USN

SECOND ROW: LT Agnaldo de SOUZA MC (Brazil), LCDR Jose BROTONS Pico MC (Spain), CDR Herbert G. W. TOEPFER MC (Germany), ENS Fausto Ramon A. Elias WILSON MC (Dominican Republic), SURG LCDR Latifat KARIM (Pakistan), CDR Sotero V. CORDERO MC (Philippines)

Official U. S. Navy Photograph by Rittmeyer R. W. HM1 USN.

Appropriate ceremonies were held in the recently renovated classrooms of the Naval Medical School in Building 110. The 10-week program includes courses in Naval Medical Management and Naval Preventive Medicine for foreign Medical Officers and Naval Nursing Orientation for military nurses. CAPT John M. Hirst MSC USN, Head of the Military Medical Specialties Department, is Program Director.

These courses, important facets of the President's People-to-People Program, include numerous professional lectures and observations as well as orientation visits to several military installations. Tours of National Parks and Historical Centers with lectures by competent historians are scheduled while enroute to medical facilities in Massachusetts, Connecticut, New York, Pennsylvania, Illinois, North Carolina, and Florida. In this way, these Foreign Military Medical Officers have adequate opportunities to become familiar with our Navy in general, our Navy Medical Department in particular, as they learn more about our country and our people. The 1963 theme "World Communication via Military Medicine" sets the basis for better understanding among the countries of the world through sincere and mutual exchange of ideas.

Graduation will be on Friday, 8 November 1963, following participation in the 70th Annual Meetings of the Association of Military Surgeons of the United States whose President is RADM C. B. Galloway MC USN.

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#### Bibliography on Soviet Mathematical Biology

The Extramural Program of the National Library of Medicine has awarded a contract to the Medical Research Foundation of Oregon in Portland, for the preparation of an annotated bibliography on Soviet work in the field of mathematical biology. The contract, made under NLM's programs for improving the international exchange of biomedical information, is designed to assist the American biomedical community in keeping abreast of Soviet progress on the uses of the physical sciences in biologic and medical research.

Mathematical biology is a relatively new discipline with considerable potential for valuable utilization of the physical sciences in gaining a better understanding of biology. The field is closely related to, and has significance in, the sciences of medical electronics, biomedical engineering, use of computers in biologic research, cybernetics, algorithm theory, biologic control systems, and theoretical biology.

The contract runs from 1 August 1963 through 31 July 1964. It will be under the direction of Dr. Walter R. Stahl, Associate Professor, Department of Mathematics, Oregon State University. Additional information regarding this project may be obtained from the Science Translation Program, NLM, Bethesda, Md., 20014. —From DHEW PHS, National Library of Medicine

\* \* \* \* \*

## ORIGIN OF AMERICAN COLLEGE OF SURGEONS\*

## Officers and Regents 1913 - 1915

At eight o'clock on the evening of May 5, 1913, in the New Willard Hotel, Washington, D.C., more than 300 distinguished surgeons from the United States and Canada gathered by special invitation to discuss the formation of a new surgical organization to be called the American College of Surgeons. Before the evening was over, the College had been founded, ground rules for Fellowship had been established, and Officers and a Board of Regents had been elected. The photographs of these illustrious officials appear upon this page.

Actually, the groundwork for the founding of the College had been laid in 1905 when a dynamic, red-haired Chicago gynecologist, Dr. Franklin H. Martin, launched a new surgical journal called *Surgery, Gynecology & Obstetrics*, which, within five years, had become successful beyond his wildest dreams. This enabled Dr. Martin to indulge his conviction that the education of surgeons could best be advanced by observing surgery done by masters of the art. Accordingly, through *Surgery, Gynecology & Obstetrics*, Dr. Martin extended an invitation to every physician in the United States and Canada, who was particularly interested in surgery, to attend a clinical meeting on surgery in Chicago from November 7 to 19, 1910. The response was staggering—1,300 doctors availed themselves of this opportunity. The organizational expenses of this meeting were borne by S.G.&O.

Because of its great success, there was an immediate and insistent demand that the meeting be an annual affair; and on the day before the 1910 meeting ended, the Clinical Congress of Surgeons of North America was established to insure this result. However, it soon became apparent that a surgical society with definite aims and an effective organization was necessary to carry on the continuing education of surgeons at these Clinical Congresses. From this need arose the American College of Surgeons. Coming at a time when surgery was on the rise and the demand for surgical education was accelerating, the College filled a need not met by any other medical organization. It rapidly and continuously gained in strength, in size, and in the respect of the profession and the public. Today, on its fiftieth birthday, the American College of Surgeons finds itself the largest and most active surgical organization in the world, as well as the oldest accrediting body for surgeons in the Americas.

The success of the College is related directly to its unceasing devotion to its original purpose—the welfare of the surgical patient. Dr. Rudolph Matas stated this goal clearly in his acceptance speech as Vice President of the College on May 5, 1913:

I believe I am voicing the sentiments of my southern colleagues when I say that those of us who are here tonight are ready to support this movement with all our good will and best energies because we believe that this organization will be a powerful and beneficent agency in the uplift of the practice of surgery. We intend to cooperate with our fellows throughout the country, because we have confidence in an organization which has for its aim the elevation of the standards of American surgery not only to



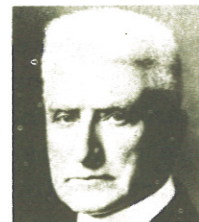
John M. T. Finney  
Baltimore  
President & Regent



Rudolph Matas  
New Orleans  
Vice President



Walter W. Chipman  
Montreal  
Vice President



Franklin H. Martin  
Chicago  
Secretary General  
and Regent



Albert J. Ochsner  
Chicago  
Treasurer & Regent



George E. Armstrong  
Montreal  
Regent



George E. Brewer  
New York  
Regent



Herbert A. Bruce  
Toronto  
Regent



Frederic J. Cotton  
Boston  
Regent



George Crile  
Cleveland  
Regent



William D. Haggard  
Nashville  
Regent



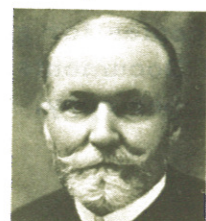
Edward Martin  
Philadelphia  
Regent



Charles H. Mayo  
Rochester  
Regent



Robert E. McKechnie  
Vancouver  
Regent



John B. Murphy  
Chicago  
Regent

the level of the highest standards of the old world, but because it aims at the realization of the highest of our own American ideals of what the surgeon should be. It should be clearly understood that this movement is not calculated solely to benefit the surgeons themselves, but through the elevation of their own standards of efficiency and professional conduct, to benefit still more the suffering public at large.

The staunch and dedicated Fellows who have managed the affairs of the College in the ensuing fifty years have never deviated from this ideal.



Harry M. Sherman  
San Francisco  
Regent



Charles F. Stokes  
New York  
Regent

\*From the announcement brochure of the 49th Annual Clinical Congress of the American College of Surgeons to be held at San Francisco, 28 October - 1 November 1963, celebrating the 50th Anniversary Year of ACS.

NOTE: RADM Charles F. Stokes MC USN was the 18th Chief of the Bureau of Medicine and Surgery and the 14th Surgeon General of the U. S. Navy during the period 1910 - 1914.

—Editor

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### PHS Publication for Laymen

A revised and expanded edition of Public Health Service pamphlet, The Food You Eat and Heart Disease, describes for laymen the association of diet and cardiovascular diseases. To place the role of diet in prevention and treatment in realistic perspective, the 12-page pamphlet counteracts popular misconceptions of diet as cure-all while stressing its importance as specific therapy in some forms of heart disease. Also, it is offered as an aid to physicians and nurses in explaining heart disease and its dietary treatment to their patients.

The reader is cautioned that diet—like drugs and all special treatments—should be prescribed by a physician. This warning is followed by simple descriptions of major cardiovascular diseases with discussions of how they are known to be affected by food and drink. The relationship between atherosclerosis, blood cholesterol level, and dietary fats is explored, as is that between sodium and hypertension and the edema of congestive heart failure. Diet information is also given for other major heart conditions, such as rheumatic heart disease, stroke, and congenital heart disease. Good nutrition and weight control are emphasized as cardinal rules for all heart patients.

Single copies of The Food You Eat and Heart Disease are available without charge from the U. S. Public Health Service, Washington, D. C., 20201. Bulk copies for general distribution may be obtained through the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402, at 10¢ per copy, \$5.00 for 100 copies.

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BUMED NOTICE 6820

18 September 1963

Subj: Handbook of the Hospital Corps, U.S. Navy (1960), NAVMED P-5004

Ref: (a) BUMEDINST 6820.10 of 18 Feb 1960, same subj

1. Purpose. To notify addressees that the following 13 chapters of subject Handbook are now available in the Navy Supply System:

Chapter I, History of the Hospital Corps  
Chapter II, Anatomy and Physiology  
Chapter IV, Nursing and Nursing Procedures  
Chapter V, Food in Health and Disease  
Chapter VI, Prevention and Control of Disease  
Chapter VII, Basic Pharmacology and Review of Toxicology  
Chapter VIII, Pharmacy  
Chapter IX, Chemistry  
Chapter X, Laboratory Techniques and Procedures  
Chapter XI, Embalming  
Chapter XII, Medical Department Support to the Fleet Marine Force  
Chapter XV, Biologic Warfare Defense  
Chapter XVII, Independent Duty

2. General. Chapters XIV, Chemical Warfare Defense, and XVI, Administration of the Medical Department, are at the printers. Major revision is being given to the two remaining chapters XIII, Nuclear Warfare Defense, and Chapter III, First Aid and Emergency Procedures.

3. Procurement. The items in paragraph 1 (above) should be procured in accordance with reference (a).

4. Cancellation. This Notice is canceled 1 December 1963.

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Chest Photofluorograms

Under article 15-90(6)(f)(2) of the Manual of the Medical Department, USN, it is no longer required to submit to BuMed reports of reexamination after a chest photofluorogram. According to article 15-90(6)(f)(4), MMD, USN, only NAVMED-618 will continue to be submitted to BuMed (Code 72), but no other material such as SF-519A, Radio-graphic Report, is required.—PrevMedDiv, BuMed

## FROM THE NOTE BOOK

Honor for Doctor Schulte. CDR John H. Schulte MC USN, Director of the Submarine Medicine Division and the Special Weapons Defense Division, BuMed, has been appointed as Military Counselor for the Industrial Medical Association. Membership in the Association is open to all medical officers with an interest in this field. Those interested in joining should contact CDR Schulte at the Bureau of Medicine and Surgery, Submarine Medicine Division, Washington, D. C., 20390.

Surgeons General of the Past

(Sixteenth in a series of brief biographies)

Rear Admiral William K. Van Reyepen MC USN, the twelfth Surgeon General and the sixteenth Chief of the Bureau of Medicine and Surgery, was born in New Jersey in 1840. On Christmas Day 1861, he was appointed from that State as an Assistant Surgeon. After a short period of duty at the Naval Hospital New York, he served aboard the steam frigate ST LAWRENCE in the East Gulf Blockading Squadron and thus saw active war service at sea in the blockade of Confederate ports. The East Gulf Squadron was assigned the duty of bottling up Southern ports on the Gulf of Mexico from Florida to Alabama.

Admiral Van Reyepen was promoted Passed Assistant Surgeon in May of 1865, and finally to Surgeon in May 1868. His service in the following years included duty at the Naval Hospitals Chelsea, Mass.; Norfolk, Va.; Annapolis, Md.; and New York. His sea duty included both the European and Asiatic Squadrons. He was promoted to Medical Inspector in August of 1887 and to Medical Director only six years later. He was subsequently appointed Surgeon General by President William McKinley on October 23, 1897 to succeed Surgeon General Newton L. Bates who died in office after serving but 18 days.

Admiral Van Reyepen served as Surgeon General until January 25, 1902, and was, thus, Surgeon General during the War with Spain and under two Presidents, William McKinley and Theodore Roosevelt. He was an excellent economist and his regime was marked by many important measures affecting the Medical Department. A hospital ship, a separate Hospital Corps, and increased rank for medical officers had been strongly urged by Surgeon General Tryon. Congress now passed legislation providing for all three of these measures. The steamer Creole was purchased and named the USS SOLACE. It was the first of our naval vessels to fly the Red Cross flag, and was of the greatest service to the fleet in Cuban waters during the Spanish American War.

In 1899, the Surgeon General was given the rank of Rear Admiral, although he still received the pay and allowances of a Commodore. During Admiral Van Reyepen's term of office, the following hospitals were commissioned: USNH Newport, 1897; USNH Sitka, Alaska, 1898; USNH Port Royal, S. C., 1898; and USNH Cavite, P. I., 1898. After retirement, Admiral Van Reyepen resided in Washington, D. C. where he died in 1920. — (Prepared by E. P. Kuhn JO2 USN)

### Naval Medical Research Reports

#### U. S. Naval Medical Research Institute, NNMC, Bethesda, Md.

1. Summaries of Research 1962.
2. Spleen Factor Effect on Cellular Recovery of Irradiated Bone Marrow: MR 005.08-1300.03 Report No. 12, August 1962.
3. Ultraviolet Fluorescence of Proteins I. The Influence of pH and Temperature: MR 005.06-0001.01 Report No. 21, October 1962.
4. Preparation of Isoionic Protein by Electrodialysis with Permselective Membranes: MR 005.08-1300.03 Report No. 14, November 1962.
5. Hesperidin, Phagocytosis and O<sub>2</sub> CO<sub>2</sub> Tensions in Subcutaneous Gas Pockets: MR 005.14-3001.05 Report No. 2, November 1962.
6. Trematode Parasites of Fishes from Egypt V. Annotated Record of Some Previously Described Forms: MR 005.09-1606.01 Report No. 4, February 1963.
7. Systemic Phosphate Influences on Dental Caries in NMRI-D Rat: MR 005.12-5000.01 Report No. 14, March 1963.
8. Growth and Metastasis of Tumor in Organ Culture: MR 005.12-0002.04 Report No. 11, April 1963.
9. Trauma of Cooling in Operative Dentistry: MR 005.12-5000.01 Report No. 13, April 1963.
10. Assay of the Radioactivity of the Aldehydogenic Moiety of Plasmalogens: MR 005.12-1100.02 Report No. 15, April 1963.
11. A Simple Thermoregulator - Memorandum Report 62-2, May 1963.
12. Egg Albumin Embedding - A Procedure Compatible with Neurological Staining Techniques: MR 005.12-0002.04 Report No. 12, May 1963.
13. Interference Patterns in Twitch Potentiation of the Rat Phrenic Nerve-Diaphragm by Aryl Esters of Tropine and  $\Psi$ Tropine: MR 005.06-0010.01 Report No. 29, May 1963.

#### U. S. Naval Medical Research Unit No. 3, Cairo, Egypt

1. Distribution of Q Fever Antibodies in Egypt and Central Sudan: MR 005.09-1150, 1963.
2. The Fleas (Siphonaptera) of Egypt. Host-Parasite Relationships of Lagomorpha (Hares): MR 005.09-1402.5, 1963.

#### U. S. Naval Air Development Center, Aviation Medical Acceleration Laboratory, Johnsville, Penna.

1. Effects of Transverse Acceleration on Performance of Two Running Matching Memory (RMM) Tasks: MR 005.13-1004.1 Report No. 9, May 1963.
2. Effects of Prolonged Water Immersion on the Ability of Human Subjects to Make Position and Force Estimations: MR 005.13-0005.7 Report No. 5, July 1963.

#### U. S. Naval Medical Field Research Laboratory, Camp Lejeune, N. C.

1. User Test of Bandage-Splint: MR 005.12-6001.6, July 1963

2. Service Test of Table, Folding Legs, Laboratory: MR 005.12-6001.6, July 1963.
3. Anthropology and Clinical Medicine: MR 005.01-0030 (A Review) August 1963.
4. Service Test of Splints, Emergency Type: MR 005.12-6001.6, August '63.

U. S. Naval Medical Research Unit No. 2, Taipei, Taiwan.

1. *Oryctolaelaps Kuntzi* n. sp. (Acarina: Laelaptidae) from a Formosan Mole, *Talpa insularis* Swinhoe: MR 005.09-1601.3.9, January 1963.
2. Experimental Infection of Crabs with *Paragonimus*: MR 005.09-2001.3.1, April 1963.
3. Intestinal Parasites of Man in Palawan, Republic of the Philippines: MR 005.09-1601.1.2, May 1963.
4. Serial Propagation of Inclusion Conjunctivitis Virus in Cultures of Primary Hamster Kidney Cells: MR 005.09-1201.12.21, May 1963.
5. Trachoma Vaccine Studies in Volunteer Students of the National Defense Medical Center. III. Oil Adjuvant Vaccine: Antibody Response Study and Eye Challenge Inoculation with Egg Grown and Purified Trachoma Virus: MR 005.09-1201.12.25, May 1963.
6. Some Observations on the Storage at -65°C of Tissue Culture Propagated Trachoma and Inclusion Conjunctivitis Viruses: MR 005.09-1201.12.26, May 1963.
7. Effect of Vaccination of Swine on the Transmission of Japanese Encephalitis Virus to Mosquitoes: MR005.09-1201.2.12, June 1963.
8. Haptoglobin Type Distribution Among Filipino Residents of the Manila Area: MR 005.09-1601.7.5, June 1963.
9. Role of Bicarbonate Pathophysiology and Therapy in Asiatic Cholera: MR 005.09-1040.1.11, July 1963.

U. S. Naval Medical Research Laboratory, New London, Conn.

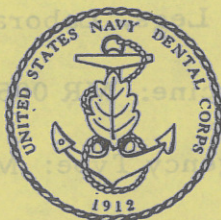
1. Night Vision Sensitivity During Prolonged Restriction from Sunlight: MR 005.14-2001-4.05 Report No. 401, May 1963.
2. Basic Physiology in Scuba and Skin Diving: MR 005.14-3100-2.07 Report No. 403, June 1963.
3. Clinical Problems of Scuba Diving: MR 005.14-3100-2.08 Report No. 405, June 1963.
4. Alveolar Gas Exchange During Submarine Escape: MR 005.14-3100-1.04 Report No. 406, August 1963.

U. S. Naval School of Aviation Medicine, Naval Aviation Medical Center, Pensacola, Fla.

1. Energy Dissipation Characteristics in Tissue for Proton Radiation in Space. I. Comparative Analysis of the Let Spectra of Monoenergetic, Flare Produced, and Fission Neutron Recoil Protons: MR 005.13-1002 Subtask 1 Report No. 24, January 1963.
2. Bioinstrumentation Control Center for the Human Disorientation Device: MR 005.13-6001 Subtask 1 Report No. 79, March 1963.

(To be continued in an early issue)

## DENTAL



## SECTION

Oral Exfoliative Cytology

The briefing on oral exfoliative cytology presented in the U. S. Navy Medical News Letter 41(6): 22, 1963, was followed by inquiries on application of this technic in Naval Dental Corps practice. A staff study by the Naval Dental School concluded that, at the present state of knowledge, exfoliative cytology is not a reliable method for diagnosis of oral cancer. On the other hand, the Veterans Administration's research has indicated that exfoliative cytology may provide a useful method for screening large numbers of subjects for oral malignancies.

The surgical biopsy remains the single most conclusive method for establishing the presence of malignant disease. Any indication of malignancy suggested by exfoliative cytology would require confirmation by surgical biopsy; and considering the potential rapid progress of acute malignancies, the oral cancer patient would be served best by a biopsy taken at the first instance. Conversely, dentists unfamiliar with the limitations of exfoliative cytology might be lulled into a false sense of security upon receipt of a negative report on a cytologic smear, when cancer actually existed. Therefore, cytologic smears are not a substitute for biopsy samples. Naval dental officers should not hesitate to biopsy oral lesions. The U. S. Naval Dental School provides adequate facilities for the diagnosis of these lesions. Dental officers who choose to submit cytologic smears together with biopsy specimens to the U. S. Naval Dental School will receive a report on each sample submitted.

The Veterans Administration, among others, is currently conducting well designed large scale research on this subject. In the interest of economy, both budgetary and in regard to disruption of the Navy's present research programs, the Bureau of Medicine and Surgery does not plan to initiate research in the field of oral exfoliative cytology, but looks forward to the reports of the existing research programs. All dental officers are enjoined to continue their interest in published literature on the subject, and to continue to rely on surgical biopsy for definitive diagnosis of oral lesions.

(BuMed Code 611)

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(To be continued in an early issue)

A Comparison of the Effectiveness  
of a Standard and an Electric Toothbrush

J. Roy Elliott, D.D.S., M.S., Columbus, Ohio, Lieutenant Commander, Dental Corps, U. S. Navy: USS BRYCE CANYON (AD36), c/o FPO San Francisco, California, J Periodont 34(4):75/375, July 1963

Proper oral hygiene is necessary to maintain oral health. Universally, the toothbrush is regarded as the most important instrument for oral hygiene. Ineffective use of the toothbrush contributes to the prevalence of dental diseases. In order to improve toothbrushing, an electric toothbrush, Broxodent, was introduced with the claim that efficient brushing could be accomplished more rapidly than with a conventional brush. The electric brush has been reported to be a superior instrument for cleaning the teeth and for gingival health but in other studies no significant difference was observed in the effectiveness of the electric and conventional toothbrushes. This study was designed to compare the effectiveness of an electric and a conventional toothbrush for cleaning the teeth.

From the analysis of the data, it was evident that the cleaning ability of the electric brush paralleled that of the standard brush, both before and after brushing instructions were given. The correlation extended to a comparison of cleaning various jaw segments. It was noted that with both brushes the right and left sides of the mouth were cleaned equally well. This is in contrast to the generally accepted opinion.

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Personnel and Professional Notes

Newly Standardized Items Available for Issue

<u>Stock No.</u>	<u>Nomenclature</u>	<u>Unit</u>	<u>Price</u>
6520-086-3211	Disk, Abrasive, Silicon Carbide, 100 Grit, 3/4", 50s	BX	.22
6520-086-3212	Disk, Abrasive, Flint, 150 Grit, 5/8", 50s	BX	.22
6520-086-3213	Disk, Abrasive, Silicon Carbide, 120 Grit, 3/4", 50s	BX	.22
6520-086-3214	Disk, Abrasive, Garnet, 180 Grit, 3/4", 50s	BX	.22
6520-086-3215	Disk, Abrasive, Garnet, 120 Grit, 1/2", 50s	BX	.22
6520-086-3216	Disk, Abrasive, Garnet, 180 Grit, 5/8", 50s	BX	.22
6520-086-3217	Disk, Abrasive, Garnet, 120 Grit, 3/4", 50s	BX	.22

Newly Standardized Items (Cont'd)

<u>Stock No.</u>	<u>Nomenclature</u>	<u>Unit</u>	<u>Price</u>
6520-086-3218	Disk, Abrasive, Garnet, 120 Grit, 5/8" 50s	BX	.22
6520-086-3219	Disk, Abrasive, Flint, 220 Grit, 5/8", 50s	BX	.22
6520-086-3220	Disk, Abrasive, Flint, 400 Grit, 5/8" 50s	BX	.22
6520-086-3221	Disk, Abrasive, Silicon Carbide, 150 Grit Waterproof, 5/8", 50s	BX	.29
6520-086-3222	Disk, Abrasive, Silicon Carbide, 320 Grit Waterproof, 5/8", 50s	BX	.29
6520-826-1300	Impression Material, Dental, Hydrocolloid Alginate Type, Regular Set, 1 lb	CN	1.30
6520-889-7028	Impression Material, Dental Hydrocolloid Alginate Type, Fast Set, 1 lb	CN	1.40
6520-890-1430	Stand, Abrasive, Disk	EA	1.20
6520-971-8220	Mandrel, Dental Handpiece, AHP, Spring Type, 6s	BX	3.10
6520-971-8221	Mandrel, Dental Handpiece, SHP, Spring Type, 6s	BX	3.10

Reduction of Administrative Correspondence in the Operating Forces - OPNAV

Notice of 11 September 1963. The purpose of this notice is to announce a project for the reduction of administrative correspondence in the Operating Forces and to suggest certain remedial measures.

All ships and stations are enjoined to take any immediate corrective actions possible within their present authority which will contribute to the objective mentioned above. Some examples are:

a. To the maximum practicable extent, avoid issuing repetitive instructions. If the Navy Directive Manual is complied with, there can be no possible need for all of the duplication now existing. Directives should be complete enough so that no further repetitive issuance is necessary in the chain of command. There is evidence that many Instructions and Notices issued are not being complied with because there are too many for the individual units to keep corrected.

b. The adoption, in appropriate cases, of form or rubber-stamp endorsements as now authorized in the Navy Correspondence Manual. It is suggested that senior commanders set an example by the use of such endorsements.

c. Certain stereotype correspondence can be sent direct to its destination with copies to the chain of command instead of via the latter. Those in the chain of command desiring to add comments may send them directly to the addressee. Applications for retirement fall into this category.

Summer Classes, Ensign 1925 Program. During the summer, two classes were held at Newport, R. I., under the Ensign 1925 Program. The first started 8 June and the second 17 August. There were 71 ensigns graduated in the first class and 119 in the second. Each class was divided into three groups for more efficient instruction and to build a spirit of competition. The courses were scheduled for four weeks and ensigns who attended represented most of the dental schools in the country. (Code 614)

Commander Kratochvil Presents Lecture. Commander Frank J. Kratochvil DC USN, on the staff of the U. S. Naval Dental School, Bethesda, Maryland, presented a lecture on 1 October 1963, to the Kanawha Valley Dental Society in Charleston, West Virginia. The lecture was entitled "Designing Your Partial Dentures." Commander Kratochvil is a Diplomate of the American Board of Prosthodontics. (Code 611)

Captain Stoll Presents Illustrated Lecture. Captain John B. Stoll DC USN, Head of the Prosthetic Dept., U. S. Naval Dental School, Bethesda, Maryland, presented an illustrated lecture to the Northeastern Dental Society, Swampscott, Mass., on 23 - 26 September 1963. The lecture was entitled "Functional Leverages Need Not be Harmful to Clapsed Teeth in the Distal Extension Removable Partial Denture." Captain Stoll is a Diplomate of the American Board of Prosthodontics. (Code 611)

Graduation Held at Naval Dental Technicians School, San Diego, Calif. Dental Technician, Basic, Class "A", Class # 12-63, graduated fifty-one USN and five U. S. Coast Guard personnel on 6 September 1963 at the Naval Dental Technicians School, Naval Training Center, San Diego, California. Bedard, Francis E., 686 32 53, DA, USN was Honor Man.

Dr. Birren Presents Lecture at U. S. Naval Dental School, Bethesda. Dr. James E. Birren, who is associated with the National Institute of Mental Health, National Institutes of Health, Bethesda, Maryland, lectured on "Age, Learning, and Memory" to staff, resident, and post-graduate dental officers, and civilian and military guests, at the U. S. Naval Dental School, Bethesda, Maryland, on Friday, 6 September 1963. Dr. Birren has been a Visiting Professor of Psychology and Human Development, and a Research Associate at the University of Chicago.

Captain Lyon Presents Seminar at Great Lakes. Captain H. W. Lyon DC USN, Dental Division, Naval Medical Research Institute, NNMC, Bethesda, Maryland, presented a special seminar to the dental officers of the Administrative and Hospital Commands, USNTC, Great Lakes, Illinois, on 11 September. Captains Lyon's lecture was entitled, "The Military Significance of the NMRI Dental Research Program." Approximately 85 dental officers were in attendance.

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## AVIATION MEDICINE DIVISION



### Bioastronautics Meeting at the Naval Medical Research Institute 10-12 September 1963

The Sixth Navy Bioastronautics Research Conference was held at the Naval Medical Research Institute, NNMC, Bethesda, Maryland on 10-12 September 1963. Opening remarks were made by Rear Admiral A. S. Chrisman MC USN, Deputy and Assistant Chief of the Bureau of Medicine and Surgery.

Captain J. R. Seal MC USN, Commanding Officer of NMRI and host to the conference, pointed out that these meetings have been held annually for the purpose of review, appraisal and collation of the Navy's research effort in bioastronautics. They are attended by the Commanding Officers and senior technical representatives of the several medical research activities having programs within the area of interest. Other participants are the senior medical staff officers in various naval bureaus and other governmental activities (NASA, for example) who support or have administrative cognizance over some phase of bioastronautics research.

Because of the overall Navy interest and orientation toward this vital field, the invitation list this year was expanded to include a number of laboratories, bureaus, and test and evaluation forces who have either a primary or auxiliary interest in this special field. More than 70 scientists from 28 naval activities were in attendance.

Following the introductory comments by Admiral Chrisman and the welcoming address by Rear Admiral C. B. Galloway MC USN, Commanding Officer, NNMC, the first day's session was largely devoted to bureau-sponsored reports and briefings and tours of component commands in the National Naval Medical Center. On the second and third days, Naval Medical Research Institute presentations, a tour of the research facilities, and reports from other bioastronautics research personnel were scheduled and well received.

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### Aviation Physiology Training

With the diminishing numbers of medical officers at naval air stations, due to the prevailing personnel austerity practices, the tasks of aviation physiology training becomes centered more and more on the aviation physiologist, the Medical Service Corps officer. It is imperative that the services of the aviation physiologist be utilized to the fullest extent in order that the mission of the

Medical Department be fully accomplished. Often the MSC Aviation Physiologist is assigned unrelated and time-consuming duties—such as Sanitation Officer, Insurance Officer, Bonds Sales Officer, and, in one instance, Assistant Paymaster to the troops. This diversion of the physiologist from his originally intended duties is not only detrimental to the program but materially affects the morale of the officer so assigned.

The duties of the aviation physiology officer are not limited solely to the low pressure chamber, night vision trainer, and the ejection seat trainer. In fact, he is expected to visit squadron areas and personnel and lecture to designated groups on such topics as oxygen equipment, survival, use of emergency and safety equipment, full pressure suits, et cetera. He should work along with squadron survival and safety officers in seeing that adequate and up-to-date equipment is available and properly stowed.

Any aviation physiologist interested in his work will readily busy himself with these duties thereby obviating the necessity of the senior medical officer's assigning all the unwanted tasks to him in order to keep him busy.

At the present time, there is a shortage of aviation physiologists who are available for the training of pilots and aircrewmen. It is planned that the procurement of new Medical Service Corps officers will end the shortage and fill all billets now vacant. However, it is extremely difficult to justify a request for these much needed officers when those who are already engaged in this work are assigned duties that can well be done by nonspecialist officers.

It is desired that the aviation physiologist be utilized to the greatest extent within his specialty. The knowledge of aviation physiology and the use of airborne personnel equipment is becoming more and more necessary to the pilot and crew of high-speed, high-performance aircraft. It is the mission of the Medical Department to teach and train Navy aviation personnel in the use of this equipment. Hardly a day passes during the review of aircraft accidents that someone fails to question the thoroughness of the aviation physiology training program. Many of the unexplained aircraft accidents have been blamed on the lack of knowledge on the part of the pilot concerning his oxygen equipment or his ejection seat equipment, et cetera.

The aviation physiology training program is only as good as the senior medical officer aboard each air station makes it. He must utilize his aviation physiologist to the fullest extent. If he needs help, then arrange for help, but don't dilute his value to the military by assigning (or permitting his assignment) to collateral tasks not in his area of responsibility.

—Aviation Med. Operations Div., BuMed.

\* \* \* \* \*

The stresses and strains of modern life are often blamed for the supposed rise in the incidence of mental disorder. Investigations, however, tend to show that mental disorders occur no less commonly in societies sheltered from these stresses and strains.

WHO Chronicle 17(1): 8, Jan. 1963

Cabin Pressure, Pressure Breathing,  
Hypoxia - Unusual Interaction

Lt(jg) R. F. Loizzi MSC USN, Aviation Physiology Training Unit, Marine Corps Air Station, Beaufort, S. C.

It was a bright, clear, moonlit night. The three F8U's were scheduled to make the return flight to their base, approximately 600 miles away, after an overnight stay. All three pilots were well rested and the stay had been uneventful with the exception of some ignition difficulties which were resolved and a problem with number three's LOX pressure which was remedied by cycling the  $O_2$  pressure build-up valve.

At 2055R the three aircraft took off at 1000 foot intervals. They started North and then executed a left turn until reaching the desired  $235^\circ$  heading from the field. During this time all radio communications among the three pilots and between number one and the field were normal. The three aircraft began a climb-out to 39,000 feet in rather loose formation, having previously planned to tighten up after they had become fully dark-adapted. At this point, number three was about one-half mile behind one and two, the three planes proceeding at .92 mach. They reached their peak altitude at about 2104R. At 2106R the aircraft reached the first checkpoint where they would have to change their course to  $182^\circ$ . One and two made the shallow left turn and then straightened out. However, at 2107R, three was observed to be still turning left, past  $182^\circ$ , and descending. Two tried to make contact with three without luck. One tried, but also failed to get an answer. Three rolled out on an easterly direction and began turning right in a 90 degree bank, his altitude about 25,000 feet at this time. He then appeared to roll wings level and to level off; however, he continued the descent, passing through mach 1.1 - 1.2, again appeared to level off, turned left slightly, and continued descent in a Southeasterly direction. Without further radio transmission, three made contact with the ground at about 2109R, 14 minutes after take-off, producing a large fireball.

Examination of the wreckage revealed a large crater, approximately 35 feet in diameter and 10 - 12 feet deep in the red, clay soil. Much of the heavier portions of the aircraft were buried in the soil at the bottom of the crater, e.g. the back of the engine was found about 18 feet below ground level.

Indirect evidence such as pieces of plexiglass and a portion of the drogue chute found at the wreckage, the absence of any PRC beacon, and eyewitness reports of no ejection, all indicate that the pilot did not leave the aircraft. This was confirmed later by the medical investigation. Only one bit of evidence was found which may have some bearing on the cause of the accident: the oxygen selector valve was found intact and in the OFF position.

The pilot's personal equipment included a Bendix chest-mounted miniature regulator, A13 oxygen mask, APH-5 helmet and Sierra mask retention kit.

Because of the possible involvement of hypoxia in this accident, the squadron AAR Board requested the Physiological Training Unit, MCAS,

Beaufort, to aid in the investigation. Using volunteer aviators from the pilot's own squadron as subjects, our job was to attempt to reproduce the flight of number three, following the same altitudes, pressures, and time-sequences which occurred before the accident and, working within these limits, produce a point of helplessness due to hypoxia approximately 12 - 14 minutes after leaving sea level. For convenience, the flight schedule of number three is reproduced here.

<u>Time</u>	<u>Cockpit Altitude</u>	<u>Aircraft Altitude</u>
0000:00	Sea Level	Sea Level
0002:30	8,000 feet	10,000 feet
0003:30	8,000 "	15,000 "
0004:30	8,000 "	20,000 "
0006:00	10,000 "	25,000 "
0007:00	12,000 "	30,000 "
0008:30	15,000 "	35,000 "
0009:30	16,500 "	39,000 "
0011:30	16,500 "	39,000 "
0012:00	10,000 "	25,000 "
0013:00	?	?
0014:00	Impact	Impact

During the first phase of these tests, it was assumed that cabin pressurization functioned normally and was utilized. Subjects A and B were taken to 16,500 feet in the low pressure chamber, simulating a normal instrument climb to 39,000 feet. To permit the maximum opportunity for hypoxia to occur, the subjects went to altitude without supplemental oxygen. They reached 16,500 feet after 11.5 minutes and remained there another 3.5 minutes for a total flight time of 15 minutes. At the end of this period neither subject experienced any symptoms of hypoxia except some mild cyanosis. These results indicate that in experienced pilots the possibility is rather remote for hypoxia to have occurred with enough severity to incapacitate the pilot within the altitude-time limits evaluated.

Therefore, in the next phase of tests, cabin pressurization was not utilized and the subjects removed their masks at intermediate altitudes during the simulated instrument climb to 39,000 feet. The results were as follows:

<u>Subject</u>	<u>Mask removed</u>		<u>End useful consciousness</u>		<u>Useful con. time</u>
	<u>Altitude</u>	<u>Time</u>	<u>Altitude</u>	<u>Time</u>	
	Sea Level	0000:00	32,500 feet	0009:02	0009:02
	10,000 feet	0003:00	29,500 "	0008:58	0005:58
	30,000 "	0008:00	35,800 "	0009:45	0001:45

The results indicate that if the mask is removed at an intermediate altitude during the climb, the pilot is rendered helpless due to severe hypoxia prior to reaching cruising altitude i. e. 39,000 feet. In these tests, the end

of useful consciousness is defined as the estimated point where the subject became totally unresponsive to any commands of the Chief Observer even when ordered to replace his oxygen mask to prevent becoming unconscious. This point was usually preceded by other symptoms such as dizziness, a "slowing down" of voluntary muscle activity, and in some instances spastic movements of the limbs and head. It was noted that, as the useful conscious time decreased, the end point came on with less warning. It can be concluded from this phase of the tests that hypoxia becomes highly suspect as the cause of number three's accident if the following conditions were present: (1) cabin pressurization was not functioning; (2) the pilot removed his mask and shut off his oxygen supply somewhere above 30,000 feet.

The third phase of the tests assumed that hypoxia actually was the cause of the accident and an attempt was made to localize the point where mask removal was accomplished. The subjects (on separate runs) were ascended to 39,000 feet with 100% oxygen under the same simulated climb conditions as above, i. e. without cabin pressurization. The results were as follows:

<u>Subject</u>	<u>Mask Removed</u>	<u>End Useful Consciousness</u>	<u>Useful Conscious- ness Time</u>
F	0011:30	0012:30	0001:00
G	0011:30	0012:23	0000:53
H	0011:30	0012:02	0000:32

These results show that the average pilot removing his mask at 39,000 feet becomes completely incapacitated after 48 seconds with a range of 32 to 60 seconds. If it is assumed that number three levelled off his aircraft at 39,000 feet still wearing his mask and thus not hypoxic to that point, it can be speculated that approximately one to one-and-one-half minutes later he removed his mask and then, one-half to one minute later, he became incapacitated due to hypoxia and his aircraft began to descend. This possibility is given further credence by the fact that, in the actual flight, number three levelled off at 39,000 feet at 2104R, nine minutes after take-off, thus indicating he was in control of the aircraft, at least until that point.

If this is true, the question of why he removed his mask is still left unanswered. During the ascents of Subjects F and G the onset of pressure breathing above 35,000 feet came, not totally unexpected, but nevertheless in such a manner as to precipitate confusion, probably because Crusader pilots rarely experience pressure breathing except in low pressure chambers. Because of the significance of this phenomenon, Subject H was briefed that he was going to make a simulated flight to 16,500 feet as in the first phase of these tests. During the ascent, all instructions he heard on the intercom supported this belief. In reality, he was taken to 39,000 feet. It was determined later that the subject hadn't the slightest suspicion of this deception. During the

ascent, Subject H reported he was having some difficulty with his mask at approximately 15,000 feet (actual altitude: 35,000 feet). He complained he was having trouble exhaling but had no explanation for it. Upon reaching 16,500 feet (actual altitude: 39,000) he requested assistance. He still could provide no other information regarding the problem besides difficulty in exhalation. When it was suggested that he check his inhalation valves, he promptly removed his mask and began working on it. He also obeyed the order to shut off his oxygen valve. Within 15 seconds he reported that he was feeling "sick" but continued his inspection of the mask. At the end of 32 seconds, he was completely helpless. He recovered within a few seconds after receiving 100% oxygen and being lowered to 30,000 feet but remembered very little of what happened subsequent to removing his mask. It is noteworthy that number three and Subject H both had their last low pressure chamber training about 18 months prior to the accident including a pressure-breathing demonstration.

It can be concluded from these tests that:

- (1) Severe hypoxia is highly suspect as the primary cause of this accident.
- (2) In order for hypoxia of this severity to occur, the cockpit altitude must have been approximately 39,000 feet and the pilot was not breathing supplemental oxygen.
- (3) One possible reason for the pilot not utilizing supplemental oxygen was an imagined malfunctioning of his oxygen equipment, a false conclusion based on the onset of pressure breathing at a time when the pilot believed his cockpit altitude 16,500 feet or below.

It should be noted here that, after a thorough investigation by the AAR Board, no conclusive evidence was found which might indicate the actual cause of the accident. This included LOX contamination, pilot fatigue and a long list of other possible causes. The Board concluded, in the absence of factual information and on the basis of deductive reasoning, that hypoxia was the primary cause of the accident with loss of cabin pressurization being a contributing factor.

What bearing does this accident have on Aviation Physiology Training? If the cause was actually due to hypoxia, then a rather unique interaction occurred which could very likely repeat itself with another pilot in another aircraft. The elements of this interaction are as follows: Surprise Onset of Pressure Breathing ("difficulty in breathing")... Removal of Mask at 39,000 Feet ("cabin altitude is only about 16,000 feet")... Oxygen Turned Off... Pilot Helpless in 30 - 60 seconds... Aircraft Out of Control... Impact. In this study, experienced pilots, who knew they were ascending above 35,000 feet, had forgotten to expect pressure breathing and were surprised by its onset. A third pilot thought he was at 16,500 feet and interpreted the onset of pressure breathing as "mask difficulty". This means (a) pressure breathing never occurred to him, and (b) his body could not tell the difference between 16,500 feet and 39,000 feet. The lesson for Physiology Training is quite clear.

First, severe hypoxia demonstrations should not be neglected after the pilot's initial indoctrination training. Most pilots interviewed here who have been flying for five or six years remember only the gimmicks of the demonstration (cards, writing, patty-cake) but none of the warning symptoms or sensations of hypoxia. Second, the end of the useful conscious time is a shady area of unresponsiveness, insidiously blending with the normal state, long at low altitudes, but becoming more narrow at high altitudes until it approaches a sharply defined point separating slight dizziness from complete helplessness. That is, not only does the total useful conscious time become extremely short at high altitude, but the warning time within the UCT approaches zero with altitude. This change from the nearly-normal state to utter helplessness took all the subjects in the study completely by surprise. Finally, pressure breathing, due to the evolution of cabin pressurization systems, has become an emergency procedure rather than a normal experience for jet aviators. Unfortunately, the very infrequency of its occurrence makes it an even greater hazard as evidenced above. In most instances, the only familiarity the jet pilot has with prolonged pressure breathing is inside the pressure chamber. Therefore, emphasis on the similarities and differences between pressure breathing and various oxygen equipment malfunctioning is a necessary element of Physiology lectures. And, in regard to the chamber run, there is no substitute for a prolonged and vigorous period of pressure breathing.

\* \* \* \* \*

Challenge of Missile Range  
Technology to Military Medicine\*

CAPT Carl E. Pruett MC USN, Bio-Science Officer and  
John N. Shellabarger, Director, Technical Support

Electronic Aids Proposed  
for Hospitals

Not long ago a medical magazine, commonly found in the waiting rooms of many doctors, carried a short article describing the electronic aids which would be used in the operation of a huge, ultramodern hospital. The most notable of these aids were:

1. A central, electronically operated transcription system for recording patient reports.
2. An electronic memory machine responding to individual code signals by giving the physician any messages that have come in during his absence.
3. Bedside control panels permitting direct communication with the nursing station, finger-tip control of radio and television, and direct-dial telephone service.

\* Pacific Missile Range, Point Mugu, California, 4 June 1962

4. Closed-circuit television guarding the entrances and exits.
5. A radio call system for key medical and nursing personnel, utilizing individual transistorized receivers.
6. An electronically guided pneumatic-tube system to speed messages and small supply items throughout the hospital.
7. An electrically controlled, fully automatic X-ray film processing system.

### Electronic Monitoring of Patient's Condition

It is interesting and yet a little disturbing to note that no mention was made in the medical magazine article of any electronic aid in recording, transmitting, or presenting the actual physiological and psychological state of a patient. Is this omission due to a lack of information or interest on the part of the author, or does it reflect a serious lag in medical technology and its application? The electronic aids mentioned are primarily administrative devices useful to the hospital system but only remotely related to the health of the individual. The primary purpose of the hospital system is to improve the health of the patient under care.

It is contended here that electronics could contribute fast, reliable, and effective communication channels from the individual patient directly to the ward-supervising nurse and to the physician. A system is visualized wherein the critical condition of a patient who is quietly dying and unable to sound an alarm would, without his voluntary action, be audibly and visibly called to the attention of the supervisor. This could be accomplished through modern electronic sensing, communicating, data-reducing, and data-displaying devices capable of automatic continuous comparison of critical physiological conditions such as body temperature, respiration rate, and heartbeat with pre-established limit norms.

Picture in your mind a present-day hospital having a ward of patients requiring close nursing supervision, with therapy based on daily ward rounds by the physician. Are the nursing notes the most reliable information obtainable on the patients' status while the physician is not at the bedside? Is the physician's daily (or as required) ward visit to the bedside the ultimate in medical practice? Can we afford the risk of human error inherent in the system of having the patient's vitality periodically determined in person by nurses and attendants? Must we rely upon the tolerance limit of the individual patient to provide for us the danger signal when he calls in alarm or pain? Must time be squandered at the bedside in taking pulse rate, respiration, and temperature to assess the patient's critical condition when this information could have been continuously available at the nurses' station.

Advancing technology requires that the medical profession become cognizant of modern telemetering and display techniques. The medical profession must recognize the utility of these modern developments in the area of medical supervision. In order to illustrate the possibilities in this field of development and to stimulate the medical profession's interest, let us examine

the problem in the light of the technology required to support the development, testing, and evaluation of present-day missile systems in the operational environment of the missile range.

#### Instrumentation for

#### Monitoring of Missiles

While a missile is being tested and evaluated, it must be closely monitored. This may be accomplished by using optical, radar, radio, or television instrumentation. In addition, many finite measurements of humidity, temperature, acceleration, vibration, noise, radiation, strain, and stress must be recorded. Sometimes they are recorded on magnetic tape in the vehicle and recovered afterward. The collected data must then be compiled, reduced, and presented in an interpretable form. The immensity and complexity of the range instrumentation system required for accurately monitoring vehicles in flight and the laboratory facilities required to conduct ground testing are almost beyond the imagination of those not directly associated with this technology.

In order to provide technical support to range and missile systems, a wide scope of scientific and engineering capability must be maintained in the technical support unit. At the Pacific Missile Range, the mission of the Technical Support Directorate is to render service pertaining to engineering, production, installation, maintenance, calibration, and custody of technical equipment. These services include:

1. Engineering development, design, and specification in aeronautics, mechanics, materials, and electronics.
2. Development and maintenance of physical standards.
3. Engineering direction and control of equipment calibration and maintenance.
4. Manufacture, modification, repair, and installation of equipment and systems.

This capability allows rapid response to operational problems and as a dividend provides the latest techniques needed to supply to the man with an idea the technical assistance needed to translate his idea into hardware.

An example of the ingenuity of the Technical Support Directorate is the recent development of an automatic iris control responsive to changing light conditions for airborne missile-monitoring cameras. This automatic control is designed to compare the light level of the photographic subject to a standard light level and automatically adjust the camera aperture for correct exposure of the film. The accuracy of the unit is better than one-half of an f stop throughout the temperature range of  $-40^{\circ}\text{F}$  to  $130^{\circ}\text{F}$ . The response time is less than one-half second from maximum to minimum aperture.

The automatic iris control was developed because of the difficulty encountered in photographing airborne testing of missiles. The inherently low exposure latitude of modern color films demands correct exposure to a

tolerance of one f stop in order to produce usable color pictures. While existing instrumentation cameras have the ability to expose film properly from about f/4 to f/22, they must be preset to an exposure value corresponding to an "average brightness" condition estimated for the flight, and all film exposed during the flight is exposed at this value. Consequently, only about 1 out of every 5 feet of exposed film produces usable pictures. The other 4 feet are overexposed or underexposed beyond the usable limits.

Addition of the automatic iris control to existing cameras has permitted fully automatic operation at a fraction of the cost of substitute cameras. An interesting note on the ruggedness and reliability of the first prototype unit is in order. Throughout the first nine months of alternately operating, loading, and unloading this unit and exposing it daily to an airborne operating environment, not a single service call or maintenance action was required. More than 10,000 feet of film were exposed during this same period with virtually no loss of data.

#### Instruments for Biological Monitoring

It is widely recognized that continued development of instrumentation is absolutely necessary if we are to solve many problems, not only of aerospace medicine, but of medicine in general. A tremendous advance in biological instrumentation will be made when we apply the technology of the missile range directly to the biological problem under the guidance of life-sciences personnel.

The first attempt to accomplish this integrated effort at Point Mugu was initiated several years ago on a "Research Aviation Medicine" project, studying stress in aviators flying high-performance aircraft and firing air-to-air missiles. Miniature portable amplifiers suitable for amplifying electrocardiographic signals to recording level were developed. These amplifiers have a gain of 2500 and a low-frequency response compatible with electrocardiographic work, and are small and rugged enough to be carried by the subject under study. The units are 1-1/4 by 3 by 6 inches and weigh only a few ounces.

Recently, subminiature voltage-controlled oscillators have been developed to multiplex several channels of instrumentation data onto a single recording magnetic tape. Each oscillator operates at its own center frequency. This frequency is then varied as the input voltage varies. This input or control voltage may be the electrocardiac voltage amplified by the amplifiers.

Similarly, the oscillators can be driven by appropriate transducers and amplifiers to record pulse rate, breathing rate, body temperature, or other physiological function. An oscillator package now being used consists of four oscillators plus an audio amplifier channel, complete with internal power supplied by rechargeable batteries.

Improved cardiograph electrodes consisting of gold-plated grids with superflexible leads have been fabricated. These electrodes make excellent contact with the skin. They are light, comfortable to wear, and allow arbitrary

location for optimum cardiac signals. Variations of these electrodes are being evaluated in gathering information from pilots flight-testing the Navy's latest all weather, carrier-based fighter aircraft, the F4H PHANTOM, firing the SPARROW III air-to-air missile.

#### Future of Medical Technology

Advanced instrumentation will most surely be applicable to measuring physiological and psychological changes in the diseased as well as in the healthy subject under stress.

Now visualize, if you will, a hospital ward of seriously ill patients, equipped with advanced instrumentation capable of continuously recording temperature, blood pressure, and electrocardiographic signals simply and painlessly at the bedside. Add to this a miniaturized data system transmitting this information to the nurses' station, where it is automatically reduced. Add, too, an advanced presentation console, which provides the busy nurse and physician with meaningful information.

Is this too much to hope for? The author thinks not. The challenge of assimilating missile-age technology into medical research and practice is here now and must be accepted.

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#### Items from NAVNEWS, Washington

The Navy's Growth During World War II. The Navy grew from not quite 190,000 men in 1940 (plus 13,766 Coast Guard) to a top of 3,855,497 (plus 171,192 Coast Guard) in 1945. Ships added to the Navy between December 7, 1941 and October 1, 1945 included: 8 battleships; 48 cruisers, 104 aircraft carriers, 349 destroyers, 412 destroyer escorts, 12 light mine layers, 55 high speed transports, 203 submarines, 874 mincraft; 1,824 patrol craft; 1,531 auxiliaries; 2,786 district craft; 4,094 large landing craft; 79,418 small landing craft and 19,259 small boats. —NAVNEWS, 1 May 1962

Warning on SCUBA Diving and Flying at High Altitudes. As a result of an evaluation made by the U. S. Naval School of Aviation Medicine, SCUBA divers who are Naval airmen will not be permitted to fly higher than 18,000 feet within 12 hours after diving to depths of 30 feet or more. The aviation medicine school conducted the evaluation at the request of the Chief of Naval Air Basic Training.

SCUBA diving has been tabbed as a potential hazard of flying to high altitudes if the flight occurs too soon after participating in diving activities. Since SCUBA diving is rapidly developing interest as a recreational sport, immediate action to call this hazard to the attention of all aircrew personnel is called for. —NAVNEWS, 15 March 1962

**RESERVE****SECTION**

Some Practical Observations  
on the Ensign 1915 Program

28 August 1963

From: Ensign \_\_\_\_\_/1915, USNR  
To: Chief, Bureau of Medicine and Surgery  
Via: Commanding Officer, U. S. Naval Hospital, San Diego, California

Subj: Clinical Clerkship Training; appreciation for

1. I reported to the U. S. Naval Hospital, San Diego, California in July 1963 for my Clinical Clerkship training and because I feel that my experience has been tremendously valuable to me, I wish to express my appreciation to all those responsible for this program.
2. I have been very impressed with the interns, residents, and staff medical officers for explaining, teaching, and quizzing me at every opportunity. Prior to my arrival, I expected to be "avoided" as only a student. This has not been the case.
3. I am particularly grateful to those responsible for the Ensign 1915 Program. Whatever the goals are for the Program, it has succeeded in (1) giving me valuable training along clinical lines; (2) showing me that the U. S. Navy is not practicing medicine five years behind civilian practice - which was a prior suspicion; (3) convincing me that there is much to be gained by an Internship in the Navy; and (4) helping me financially. This is a fact which cannot be overlooked in the face of the cost of a medical education. This last point cannot be emphasized enough, and I feel that all those concerned should be commended for the service they are performing for individual students as well as our Country.
4. As a result of this experience, I am looking forward to a Navy Internship, as well as the opportunity to serve as a Medical Officer for a period of time, as yet not determined. Perhaps in this way I can at least in part only, repay the Navy for their time, money, and efforts.

S/ \_\_\_\_\_

## NOTE:

This letter was forwarded by Rear Admiral H. J. Cokely, MC, USN, CO of the USNH, San Diego to Rear Admiral E. C. Kenney, Chief of the Bureau of Medicine and Surgery "noting with pleasure the attitude displayed by this young officer." It not only confirms the excellent features of the Ensign 1915 Program but just as importantly - it proves that each individual intern, resident and staff member of the clerkship hospitals and the effort and attitudes they demonstrate in dealing with the summertime Medical student - are the real determining factors in whole-hearted acceptance of our programs and qualities of medical care.

— Editor

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Navy Ensign 1915 Medical Program  
(continued)

Senior Medical  
Student Program

1. This program is open to qualified students enrolled at medical schools accredited by the Council on Medical Education and Hospitals of the American Medical Association. Students who have completed their second year of medical school may make application at any U. S. Navy Recruiting Station. Active duty covers the period of continuous attendance at school in studies that are prescribed for the senior year as certified by the Dean. To be eligible for participation, you must be an Ensign 1915 U. S. Naval Reserve, or agree to accept such an appointment if selected. A board convened in the Bureau of Medicine and Surgery selects the candidates for participation in this program.
2. Physical standards of this program are the same as those established for Regular Navy staff corps officers.
3. Active duty orders will be mailed to you via your Professor of Naval Science or your district commandant. Active duty will commence upon reporting in accordance with the instructions contained in such orders and the completion of proper endorsements.
4. You agree, in writing, to accept a Regular Navy commission, and if a Regular Navy commission is not tendered, to accept an appointment in the Naval Reserve.
5. In accepting an appointment in the Regular Navy or Naval Reserve, as a result of having active service in the Senior Medical Student Program as an Ensign 1915, you are obligated to serve on active duty for a period of three years. This active service will commence upon completion of not

more than twelve months of a civilian or naval internship. Providing that you have twenty-four months obligated military service to perform, this affords you a splendid opportunity to discharge your obligation and serve an additional year in return for the benefits received in the Senior Medical Student Program. With no obligated military service to perform, upon enrollment in the Senior Medical Student Program, you obligate yourself to serve for the same period of three years.

6. As a medical student, you will receive the full pay and allowances of an Ensign 1915 while enrolled on active duty. Pay and allowances are based on longevity as follows:
  - a. Less than two years and no dependents, you will receive \$355.38 per month; with dependents (a member of your family dependent upon you for financial support), you would receive \$380.28 per month.
  - b. Over two but less than three years and no dependents, you would receive \$433.08 per month; with dependents, you would receive \$457.98 per month.
  - c. Over three but less than six years and no dependents, you would receive \$508.08 per month; with dependents, you would receive \$532.98 per month.
7. In addition to the pay and allowances, you are credited with two and one-half days of annual leave for each thirty days of active duty served.
8. The wearing of the naval uniform is permitted only when authorized by appropriate naval authority.
9. Timing is very important. An average of four months is required to process each application. February 1 each year is the absolute deadline for completed applications to be forwarded to the Bureau of Naval Personnel, Navy Department, Washington, D. C. This is necessary so that sufficient time is given to the board in the Bureau of Medicine and Surgery to pass on the professional qualifications, and the board in the Bureau of Naval Personnel to pass on the overall qualifications of each applicant. Those selected are required to meet the moral, mental, and physical standards of Navy acceptance. All applicants will be notified by individual letter of their acceptance or rejection not later than the first week in May.
10. Make your application as early as possible upon the satisfactory completion of the sophomore year at the nearest U. S. Navy Recruiting Station.

## Qualifications for Ensign

## 1. Sex

Men or Women

## 2. Age

- a. Men or women with no prior military service should be at least 19 and of such age that upon expected date of graduation, they will be under 33. The maximum age limit for men or women with prior active military service may be adjusted on a month-for-month basis, depending upon the number of months of active military service performed, but in no case to exceed 36 months. Applications cannot be accepted from any person who will have passed his 36th birthday when he becomes eligible for superseding appointment following graduation from medical school.

(to be continued)

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